2.0 DESCRIPTION AND EVALUATION OF ALTERNATIVES

2.1 INTRODUCTION

This section discusses the alternatives considered during the preparation of the EIS, including those that were eliminated from further study, those considered in detail, and the No-Action alternative. Although it fails to meet the Purpose and Need of the proposed project, the No-Action alternative always remains as an alternative to the applicant's proposed action (i.e., widening of portions of the Freeport Harbor Jetty and Entrance Channels).

This discussion is intended to form the basis for the USACE's permit decision. As a result of the decision process, the USACE may issue the permit, deny the permit, or issue the permit with modifications or conditions. As discussed in Section 2.4.1, the No-Action alternative is considered to be equivalent to denial of the permit by the USACE.

While alternate sites might be considered alternatives for some projects that address a national or statewide-need, such is not the case for the present Permit Application. Therefore, the types of alternatives addressed were widening alternatives and dredged material placement alternatives at the project location.

2.2 WIDENING ALTERNATIVES

The restrictions on traffic at Port Freeport arising from the channel width are noted in Section 1.2 and in the USACE 905(b) evaluation document (USACE, 2002): vessel length, vessel beam, one-way traffic at all times, and daylight only traffic. Design parameters for channel dimensions are normally based on the channel width (W) versus the maximum vessel beam allowed to transit the channel (B). ASCE (2004) provides information from three manuals on ship channel design. Table 2.2-1 is based on the latest of these (USACE, 2002) and shows the suggested conservative (minimum) values of W/B for various conditions and one- and two-way traffic, assuming best aids to navigation.

TABLE 2.2-1

MINIMUM CHANNEL WIDTH/MAXIMUM BEAM (W/B) FOR VESSELS ALLOWED TO TRANSIT A CHANNEL UNDER VARIOUS CONDITIONS

	Current in Knots		
	0.0 to 0.5	0.5 to 1.5	1.5 to 3.0
Minimum W/B for one-way traffic	2.75	3.25	4.0
Minimum W/B for two-way traffic	4.5	5.5	6.5

Two possible widths (500 and 600 ft) were examined as alternatives. Since studies (Fugro Consultants, Inc. [Fugro], 2005) showed that the maximum channel width should not exceed 600 ft to maintain jetty stability (550 ft inside Channel Station 38+00) and since the USACE had selected 600 ft as the maximum

width alternative (USACE, 2002), 600 ft was the maximum width examined. Table 2.2-2 shows values of W/B for the existing channel width (400 ft) and the two alternatives for a series of vessel beams: 107 ft (width requiring daylight-only transits), 125 ft (typical maximum beam [Rodino and Moseley, 2005]), 138 ft (maximum presently calling on Seaway and ConocoPhillips terminals (Permit Application 23752), 145 ft above which waivers are required (Permit Application 23752), and 148 ft (SUEZMAX), the maximum that Seaway and ConocoPhillips terminals would likely to be able to accommodate (Permit Application 23752).

TABLE 2.2-2

W/B VALUES FOR VARIOUS VESSEL BEAMS AT A 400-, 500-, AND 600-FT CHANNEL WIDTH

Ship Beam (ft)	400 ft	500 ft	600 ft
		Channel width to beam ratio (W/B)	
107	3.73	4.67	5.61
125	3.20	4.00	4.80
138	2.90	3.62	4.35
145	2.75	3.44	4.13
148	2.70	3.38	4.05

As can be seen, the existing channel (400 ft) is marginal for the 145-ft beam vessel even with one-way traffic and ideal conditions (less than 0.5 knot cross current), thus the need for waivers above this beam. A channel width of 500 ft allows two-way traffic only for the 107-ft beam vessels under ideal conditions, while a 600-ft channel allows two-way traffic for vessels up to 133-ft beam (extrapolating from the data in Table 2.2-2 such that W/B = 4.5) under ideal conditions and one-way traffic for 148-ft beam vessels, even with a 3 knot cross current (which occurs roughly 5% of the time [Permit Application 23752]). Since the benefits from the widening are directly related to reducing limitations on transits, the 600-ft width is the proposed alternative, and the 500-ft width is eliminated from further consideration because it does not effectively meet the purpose and need for the project, as defined in Section 1.

2.3 DREDGED MATERIAL PLACEMENT ALTERNATIVES

The proposed action, as described in Section 1.1, involves widening portions of the Freeport Harbor Jetty Channel (from Channel Station 63+35) and all of the Freeport Harbor Entrance Channel. The proposed widening would generate approximately 3.2 million cubic yards (mcy) of new dredged material. Approximately 2.9 mcy of the new work material would consist of clay material and about 300,000 cubic yards (cy) would consist of silty/sand material.

A Dredged Material Management Plan (DMMP) Workgroup, comprising the following agencies and other entities, met to discuss the potential alternatives for dredged material placement:

USACE

National Marine Fisheries Service (NMFS)

U.S. Fish and Wildlife Service (FWS)

U.S. Environmental Protection Agency (EPA)

Texas Parks and Wildlife Department (TPWD)

Texas General Land Office (GLO)

Texas Commission on Environmental Quality (TCEQ)

Port Freeport

HDR/Shiner, Moseley & Associates, Inc. (HDR/SMA)

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Seventeen placement alternatives were identified and considered by the DMMP Workgroup (Table 2.3-1 and Figure 2.3-1). These alternatives included upland confined placement areas (UCPA), beach nourishment, marsh restoration, upland beneficial use (BU), offshore BU, and use of an Ocean Dredged Material Disposal Site (ODMDS). Use of the material for BU was given primary consideration by the DMMP Workgroup. A total of five types of BU placement options (habitat berm, feeder berm, energy dissipating berm, beach nourishment, and marsh restoration) were subjected to a preliminary screening process to determine feasibility. The process took material characteristics, environmental effects and permanence, dredge type applicability, pumping cost versus distance, reliability, permanence, public perception, and overall performance into consideration. Through this process, it was determined that the physical characteristics of the clay material made it unsuitable for the BUs being considered.

The three offshore potential BU sites (habitat, feeder, and energy dissipating berms) were removed from further consideration by the DMMP Workgroup or the Applicant for various reasons, including reliability as a BU, lack of permanence, and/or overall performance. Studies (SMA, 2005) determined that the offshore berms (alternatives 8 and 9 in Table 2.3-1), as designed, would not provide wave protection or function as a feeder berm or surf break. The fisheries habitat benefits of the offshore topographic high (alternative 7 in Table 2.3-1) were questioned by the DMMP Workgroup and since there was already a previously designated offshore dredged material disposal site (ODMDS) for construction material, the DMMP Workgroup determined that any benefits that would accrue from a topographic high would be just as substantial at the ODMDS as at a previously undisturbed area nearer shore. Therefore, the topographic high was also eliminated from further consideration.

Two potential beach nourishment locations were identified (placement on Surfside Beach and placement on Quintana Beach in front of the Seaway UCPA). The placement of the 300,000 cy of silty/sand new work material at either of these locations was determined to be another BU option (alternative 5 in Table 2.3-1).

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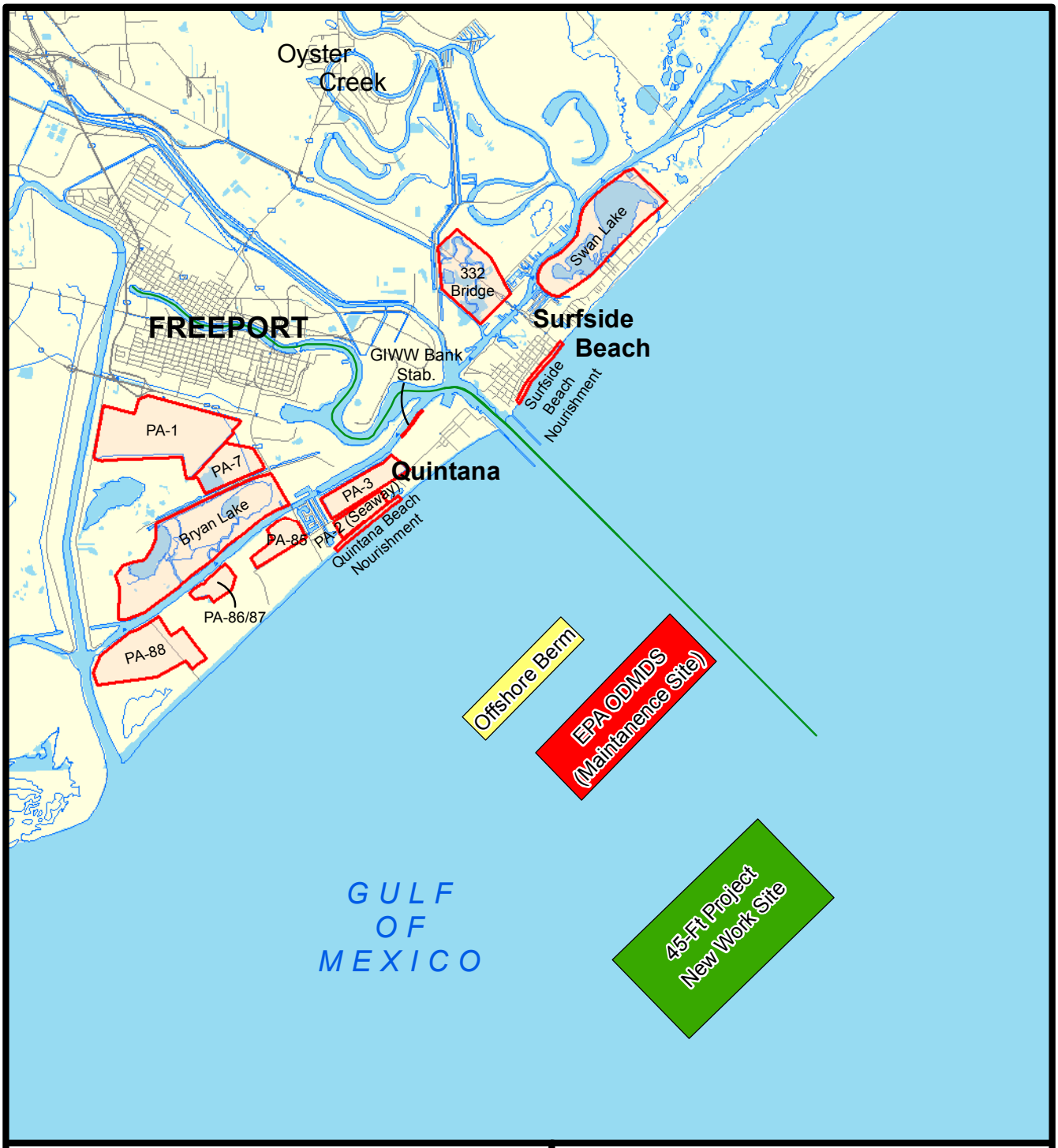

PBS&J
6504 Bridge Point Pkwy, Ste. 200
Austin, Texas 78730
Phone: (512) 329-8342 Fax: (512) 327-2453

Figure 2.3-1
Freeport Channel
Ocean Dredged Material
Placement Area Alternatives

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Job No.: 441591.00	Scale: 1:120,000
Prepared by: Emonshaugen	Date: 10/19/2006
File: N:/44159100/Projects/ODMDS.mxd	

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TABLE 2.3-1

NEW WORK PLACEMENT ALTERNATIVES

Alternative	Placement Alternative	Dredge Methodology	Potential Capacity Silty-Sand Material[1]	Potential Capacity Clay Material[2]	Potential Beneficial Use	Containment Requirements	Issues
1	Swan Lake Marsh Restoration/Creation	Hydraulic	~ 100K CY (33%)	~ 250K CY (20%)	Yes	GIWW Interface	• Presence of oyster beds • Active fishing area • Freeport Wiggles Sect. 216 study conflict
2	Bryan Lake Marsh Restoration/Creation	Hydraulic	~ 60K CY (20%)	~ 150K CY (12%)	Yes	None	• Presence of oyster beds • Strategic Petroleum Reserve security concerns • Potential Port Freeport future mitigation or development site
3	332 Bridge Marsh Restoration/Creation	Hydraulic	~ 300K CY (10%)	~ 0 CY (0%)	Yes	Drainage Canal Interface	• Presence of oyster beds • Active fishing area
4	GIWW Bank 'Stabilization'	Hydraulic	Not Suitable (0%)	??%[3]	Yes	Yes	• Construction difficulty (long, narrow placement corridor) • Containment needs along bank a major factor
5	Beach Placement – Quintana or Surfside	Hydraulic	100%	Not Suitable (0%)	Yes	None	• Quality of sandy material
6	DMPA "Seaway" Levee Protection/Stabilization	Hydraulic	Not Suitable (0%)	~ 150K CY (12%)	Yes	None	• Would most likely preclude driving on this section of beach • Material would be sacrificial in nature, fines would be on beach for a long time
7	Offshore Berm – Fish Habitat	Mechanical/ Hydraulic	100%	100%	Yes (See Issues)	None	• Workability
8	Offshore Berm – Wave Protection	Mechanical / Hydraulic	100%	100%	Yes (See Issues)	None	• Workability
9	Nearshore Berm – Beach Feeder Berm/ Surf Break	Hydraulic	100%	Not Considered for Clayey Mat'l	Yes	None	• Workability
10	Upland Confined Placement DMPA "Seaway"	Hydraulic	Not Considered	~ 150K CY (12%)	No	Dike Raising Required	• Freeport LNG borrow pit not large enough to accommodate material without additional dike raising efforts

Table 2.3-1 (Cont'd)

Alternative	Placement Alternative	Dredge Methodology	Potential Capacity Silty-Sand Material[1]	Potential Capacity Clay Material[2]	Potential Beneficial Use	Containment Requirements	Issues
							• Port Freeport prefers not to place material in this Port controlled DMPA
11	Upland Confined Placement DMPA "85"	Hydraulic	Not Considered	~ 0 CY (0%)	No	Dike Raising Required	• DMPA Capacity would be exceeded without significant dike raising
12	Upland Confined Placement DMPA "3"	Hydraulic	Not Considered	~ 0 CY (0%)	No	In Place	• Limited existing capacity is already designated for use
13	Upland Confined Placement DMPA "86 / 87"	Hydraulic	Not Considered	~ 0 CY (0%)	No	In Place	• DMPA is designated for GIWW maintenance material placement
14	Upland Confined Placement DMPA "88"	Hydraulic	Not Considered	~ 0 CY (0%)	No	In Place	• DMPA is designated for GIWW maintenance material placement
15	Upland Confined Placement DMPA "7"	Hydraulic	Not Considered	~ 0 CY (0%)	No	In Place	• DMPA capacity has been reached • Adjacent property restrictions do not allow expansion
16	Upland Confined Placement DMPA "1"	Hydraulic	Not Considered	~ 0 CY (0%)	No	In Place	• Limited existing capacity is already designated for use
17	ODMDS Placement	Mechanical/ Hopper	100% (Including Entrance Channel)	100% (Including Entrance Channel)	No	None	• Not BU

[1] Based on preliminary analysis of geotechnical information, the quantity of silty-sand materials in the Jetty Channel is assumed to be approximately 300,000 cubic yards.
[2] Based on the overall quantity of material in the Jetty Channel with the aforementioned estimated quantity of silty-sand materials removed, the quantity of clay materials is assumed to be approximately 1,300,000 cubic yards (the remaining 1.6 MCY of material is located in the Entrance Channel.
[3] GIWW 'Bank Stabilization' Capacity was not calculated because of the multiple factors that make this alternative non-viable.

Three potential marsh restoration BU areas (alternatives 1, 2, and 3 in Table 2.3-1) were identified during a DMMP workshop in December 2005:

1. Swan Lake
2. Wetland areas near the SH 332 Bridge
3. Bryan Lake

These areas were targeted after reviewing aerial photographs of the area, based on the experience of the agency personnel and because of the significant size of the potential open water area in each that could be built up to wetland habitat. During a follow-up meeting in January 2006 and a subsequent desktop investigation and field visit, the consensus of the Workgroup was that Swan Lake could be removed as a viable BU area because of the significant presence of oysters and fishing activities and potential conflict with improvements to the Gulf Intracoastal Waterway (GIWW) at an area near Swan Lake, known as the Freeport Wiggles. However, the DMMP Workgroup requested that a habitat assessment be conducted for the 332 Bridge and Bryan Lake marsh areas.

Therefore, a more extensive field visit was conducted at the 332 Bridge Site and the Bryan Lake Site, which was documented by photographs and a habitat assessment report (Appendix B). Based on the analysis of the data from this field effort, the Bryan Lake Site was eliminated from further consideration because of the presence of oysters, shallow water depth, health and value of the existing fringing marsh, and value as a loafing and foraging area for waterfowl. These findings were reported at the next meeting of the DMMP Workgroup, in February 2006.

To complete the analysis, costs were developed for the 332 Bridge Site and beach nourishment (SMA, 2006), as the only two remaining feasible BU alternatives for the 300,000 cy of silty/sand new work material. The cost estimate took into consideration the type of dredge used, dredging time, dredging conditions (i.e., depth of water), the use of heavy equipment to manipulate the material, and the amount of material manipulation required. Based on the cost estimate, the 332 Bridge Site was estimated to be much more costly (over $500,000) than the beach nourishment option. Thus, the 332 Bridge Site was eliminated from further consideration.

Beach nourishment at either Quintana or Surfside remained as a viable BU placement option for the 300,000 cy of new work material. The two alternative locations, Surfside and Quintana, will both be carried through the EIS for complete analysis, along with the No-Action alternative. Since a BU was available for the sandy material, all non-BU options, including ocean placement, were eliminated for the sandy material.

Once it was determined the 2.9 mcy of clay material were not viable for the BU alternatives being considered, several upland placement options were considered. However, as seen in Table 2.3-1, the upland PAs either didn't have capacity to accept the material or were designated for other uses. The major

portion of the dredging of the clay material will be dredged by hopper dredge and, therefore, ocean placement was selected as the proposed alternative for placement of this material.

2.4 ALTERNATIVE DESCRIPTIONS

The following subsections provide a description of the alternatives carried through and evaluated in this EIS. The alternatives include the No-Action alternative and the proposed action with two alternative BU PAs.

2.4.1 Alternative 1: No-Action Alternative

The No-Action alternative for this project is one which would result in no construction requiring a USACE permit. Since the proposed project requires dredging activities in navigable waters, it could not be constructed without a permit from the USACE. Thus, the No-Action alternative is equivalent to USACE denial of the permit for widening the Freeport Harbor Jetty and Entrance Channels. In the event of permit denial, the channel would not be widened.

Although a Federal Freeport Harbor Channel Improvement project has been proposed that includes widening and deepening the Freeport Harbor Jetty and Entrance Channels, the approval and implementation of the project is uncertain. Thus, under the No-Action alternative, current navigation restrictions, as described in Section 1.2, would continue and the Port of Freeport would not benefit from the elimination of those operational constraints. Vessels entering the Port of Freeport would continue to be delayed by one-way traffic and daylight-only restrictions and vessel safety would not be improved.

2.4.2 Alternative 2: Proposed Action with Placement at Quintana

The proposed action is the widening of the Freeport Harbor Jetty Channel from Channel Station 63+35, using a combination of mechanical, pipeline, and hopper dredges. The Jetty Channel would be gradually widened, at the authorized depth, up to an additional 150 ft for 1,835 ft to Channel Station 45+00. From that station for about 500 ft to Channel Station 40+00, the widening would go from an additional 150 ft to an additional 200 ft. The remainder of the Jetty Channel and the entire Freeport Harbor Entrance Channel (to Channel Station -260+00) would then be widened an additional 200 ft. The total channel length proposed for widening is 32,335 ft (6.1 miles).

The proposed action would result in approximately 3.2 mcy of new work dredged material consisting of approximately 2.9 mcy of clay/silt material and about 300,000 cy of silty/sand material. If approved by the EPA, the clay/silt material would be placed in an ODMDS that would be redesignated for use by EPA under USACE authority (Appendix C).

Under Alternative 2, the 300,000 cy of silty/sand material would be used beneficially and placed on Quintana Beach in front of the Seaway UCPA. The beach on either side of this location has been enhanced through GLO or other programs, leaving a "gap" in front of the Seaway UCPA. Placement of

the material in this location would fill in the gap, allowing for continuous beach use and providing some protection from erosion for the Seaway UCPA.

2.4.3 Alternative 3: Proposed Action with Placement at Surfside

The proposed action under Alternative 3 is the same as that described for Alternative 2. However, under Alternative 3, the 300,000 cy of silty/sand material would be placed on Surfside Beach. Placement of the material in this area would provide some protection from erosion for homes located along the beach.

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